Nuclear knowledge management in radioactive waste management programmes

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Nuclear activities began in Argentina in 1950 with the creation of the Argentine Atomic Energy Commission (CNEA). Since its creation, the CNEA and the Argentine nuclear sector have been covering the whole spectrum of the peaceful uses of Nuclear Energy.

Originally, the management of the radioactive wastes and spent fuels generated by nuclear activities was a CNEA responsibility, then formally appointed by a national law in 1997. Finally, and as a consequence to the Radioactive Waste Management Regimen, the National Programme for Radioactive Waste Management (NPRWM) was created depending on CNEA to fulfil the institutional functions and responsibilities to guarantee the safe management of radioactive waste.

In late 2007, the Nuclear Knowledge Management (NKM) group, understanding the need to preserve knowledge related with radioactive waste, formulated the CONRRaD Project with the aim of developing and implementing a sustainable knowledge management system.

The CONRRaD Project was highly focused on minimising the loss of radioactive waste management knowledge related to processes and facilities as a consequence of staff ageing and retiring, promoting transfer and preservation so as to ensure that future generations interpret and improve the management of waste, protecting the environment and people’s health.

Therefore, during the execution of the CONRRaD Project, the following activities were performed applying NKM tools and methodologies:

- A Knowledge Loss Risk Assessment of the Radioactive Waste Management staff was conducted. Then the attrition factor of every member was obtained. As a result, an attrition factor ranking was elaborated and used in the formulation of the Knowledge retention plan.

- The Radioactive Knowledge map was developed; this activity consists of structuring and categorising the knowledge domain, identifying the taxonomies, the processes, the concepts and other entities.

- The CONRRaD portal was designed, developed and implemented based on the Open software which integrates knowledge tools, data, systems and Knowledge database. Working as a repository of critical knowledge, the portal has a search engine with document indexation, a collaborative Wiki, a forum to capture virtual discussions, tools to follow up projects and resources to surf on the whole available knowledge domain.

Figure 35 shows the process that has been applied in the development and implementation (D&I) of the CONRRaD Project. This methodology was previously applied to the Nuclear Power Plant NKM project that allowed testing the method.
Since 1969 the National Atomic Energy Commission (CNEA) has been operating a waste management area called Área de Gestión Ezeiza (AGE) in Buenos Aires’ Province, which, among its facilities, has laboratories for waste characterisation, and facilities for radioactive wastes treatment, conditioning, packaging, storing and disposal of low-level radioactive wastes.

Among its duties, the NPRWM has the responsibility of maintaining a documented record system to preserve the knowledge that is available and relates to the mentioned facilities. The STOReR system has been designed with the aim of ensuring traceability through all the steps of radioactive waste management from generation to storage or disposal. Apart from upgrading an application in use since 2001, the new software includes improvements in the inventory calculations according to the current regulations.

Basically, the system consists of two applications. One application called PAGE is on the Net and it is available for the producers. These producers are the facilities that generate radioactive waste as a consequence of their normal operation. PAGE enables the producers to access all the services provided by AGE more easily. Not only are producers the users of PAGE, but there are also authorised owners of radioactive sources and devices because AGE provides transitory or permanent storage of these elements.

The other application called STOReR is the main one which provides the capabilities needed to support the whole system, such as the databases storage and management. STOReR is for the exclusive use of AGE workers who are grouped and entitled to specific permissions according to their operational duties and these have access to the system via an internal network. The STOReR system is a tool for knowledge management applied to process and is expected to be used in other facilities such as nuclear power plants. Figure 36 shows a simplified scheme of the whole system, including users, applications, drivers and radioactive waste elements, to facilitate the understanding of its global operation.
1. Request of containers.
2. Request of waste management services.
3. Inspection services.
5. Radioactive waste access to the Área de Gestión Ezeiza (AGE).

The following long time strategies have to be adopted to assure the sustainable NKM program applied to waste management:

- The continuous monitoring of IT hardware and software infrastructures to minimise the risk of knowledge loss due to the fact that IT technologies may become obsolete.
- Motivation of young people in R&D on Radioactive Waste management.
- The continuous up-to-date teaching and training methods and technologies to facilitate young generations knowledge transfer.
- The continuous administration and maintenance of the CONRRaD portal.
- The continuous up-to-date NKM process.
- The continuous up-to-date waste management process.
- The permanent alignment of the CONRRaD strategy with the Strategic Plan of Nuclear Waste Management.

The successful implementation of the whole NKM program will provide traceability and preservation in such a way that people can trust in the authenticity and veracity of the information to use it with confidence.